Listing application for:
Central Bus Station and Car Park, Tithebarn Road, Preston, Lancashire
Applicant: Christina Malathouni (c.malathouni@liverpool.ac.uk)
on behalf of The Twentieth Century Society
27 December 2012

Main document: Special Architectural Interest

GROUNDS FOR A NEW LISTING APPLICATION:

This new nomination for listing of the Central Bus Station and Car Park, Preston, Lancashire, ('Preston Bus Station' / PBS) is submitted on the basis of new archival information that has not been taken into consideration in earlier assessments of the building for statutory protection.
On 17 December 2012 Preston City Council voted, in principle, in favour of the demolition of the building. This nomination is therefore submitted in response to the new threat to the building.

APPLICANT:

This listing application is submitted on behalf of the Twentieth Century Society. The author is currently Lecturer at the Liverpool School of Architecture but has served as Case Officer for the Twentieth Century Society for four years (Aug. 2008 - Aug. 2012), during which period she ran the Society's campaign for Preston Bus Station.

EARLIER LISTING APPLICATION and CURRENT STATE OF RESEARCH:

The Society stands firmly by its previous listing application (submitted in January 2009) and is in full agreement with English Heritage's assessment proposing listing at Grade II (English Heritage UID: **167735**; Advice Report, 8 December 2009). It is on this basis that further research was undertaken at the Building Design Partnership's archive in London last summer (July 2012). This additional research was to be used for a publication on the building. A research proposal under the title *Preston Bus Station: Passionately Loved, Brutally At Risk* was submitted by the author (with the support of the Society's Publications Committee) to the *RIBA Research Trust Awards 2012* and was shortlisted out of about 80 submissions. New material reviewed as part of this research reveals an overlooked aspect of the building's design that adds weight to its repeatedly acknowledged 'special architectural interest' (thematic survey on Road Transport Buildings by the Royal Commission on the Historical Monuments of England, January 1998; EH Advice Report, 8 December 2009). In view of the recent renewal of the long-standing threat of demolition for the building, this new information is submitted here in support of a new listing application.

2009 ASSESSMENT:

EH's Advice Report for PBS (8 December 2009) identified the following 'reasons for designation decision [recommendation for listing at Grade II]':

> 'Preston bus station and car park is recommended for listing at Grade II for the following principal reasons:
> '* The bus station, car park, and taxi rank, opened in 1969 to the designs of BDP, remains a little-altered and remarkably good example of integrated 1960s traffic planning that still functions as originally intended.
> '* The curved concrete front to the car park decks are signature features of the design and focus attention on the building's great length, whilst creating an elegant light and dark horizontal banding effect along the entire main east and west elevations.
> '* The building displays an unusual blend of New Brutalist architecture that is mellowed by an inspired application of upturned curves to the main elevations, sweeping car park ramps and contrasting small-scale taxi rank.
> '* It is a notable example of an integrated bus station and car park, embodying the increasingly important place of motor traffic in the modern city.
> '* It represents an important stage in the evolution of integrated architectural and design practice in post-war England, pioneered by Building Design Partnership with architecture, interior design, landscaping, graphic and typographic design working to a common end, and is an important work from this prominent practice.'

NEW INFORMATION – ADDITIONAL 'SPECIAL ARCHITECTURAL INTEREST':

The archival material discovered last summer reveals a number of references in the architectural and technical press which discuss the use of 'Glass Reinforced Polyester' (GRP) in PBS. The use of GRP

is identified as particularly extensive, as integral to the 'integrated design' ethos of BDP and the special requirements of the PBS project and as technologically innovative within its English context.

For all these reasons, it is argued here that PBS also displays 'technological innovation and virtuosity' and is therefore a 'nationally important example of a particular building technique'; that is, in addition to those aspects covered by EH's 2009 assessment, yet another aspect of the statutory criteria for special architectural interest is satisfied:

> To be of special architectural interest a building must be of importance in its architectural design, decoration or craftsmanship; special interest may also apply to nationally important examples of particular building types and techniques (e.g. buildings displaying technological innovation or virtuosity) and significant plan forms. ('Principles of Selection for Listing Buildings', DCMS, March 2010, §9)

THE USE OF GLASS REINFORCED POLYESTER (GRP) IN PRESTON BUS STATION

Although at present largely identified with concrete only, upon its completion Preston Bus Station was described as a building built of 'concrete and GRP'. These were considered to be 'the two dominant materials in this scheme'. PBS is indeed constructed of reinforced concrete, a great part of which is in the form of 2,800 precast concrete units that were cast in GRP moulds. This use of GRP was to become largely invisible once the scheme was completed, however, this material also remained in evidence throughout the building in other applications: it was used for litter bins, poster boards, and numerous signs including gate number and destination lists, timetable holders and the large yellow arrows which direct drivers up and down the car park ramps. Finally, the Car Park pay kiosks were also designed by the building's architect, Keith Ingham, and constructed entirely of GRP.

(a) GRP formwork: technical requirements and achievements

The use of GRP moulds for the precast units of the PBS concrete structure was a key decision during the tendering stages. The many compound curves within the lines of the main beams and the upswept curves of these edge units were important factors in the decision to use GRP formwork. By using GRP moulds the architect was able to create a building with curved edges and a smooth surface finish.

Considerable technical difficulties had to be overcome by the manufacturers in order to produce the moulds. Their production was therefore a technical achievement that involved close collaboration between the architects, engineers and contractors – same as with the rest of the PBS project and in line with the firm's distinctive integrated approach. As the site area was large enough to enable the economical establishment of a site production system, this allowed for close control of all details. Casting was carried out in a casting yard on the east side of the building, one of the largest precast yards on a Laing building site. It occupied a new concrete apron at the front of the old bus station (whose back was turned to front). The level of the yard had been lowered so that the coaching apron could be paved over the concrete bases which had been needed for the large formwork cradles.

Precast units were then lifted into position by crane. A travelling derrick on 600ft of track ran the full 620ft frontage between the yard and the new building. This was used for lifting the steel reinforcement into the moulds, for raising completed units from the moulds and for placing them in position on the building. With its 10-ton carrying capability and 100ft reach, the self-propelled Scotch derrick was one of the largest cranes used by the building industry in this country, and had some impressive development contracts to its record. On the west side a travelling tower crane was used for placing wet concrete for the in situ structural topping.

Under these site conditions, a total of 12,000ton of precast concrete (2,800 precast concrete units) was produced in 50 weeks with a high degree of accuracy. E-type moulds were used for the 1,395 four-ft high curved parapet units of the car park's four storeys, which overhang the bus-bays by eight or nine feet and are the most striking architectural feature of the scheme along the two main elevations of the building. There were also 12 moulds for the main beams and others for the ramp units and special beams, for example, forty-foot long concrete beams for the floor structures, which weighed four tons each when lifted out of the fibreglass moulds.

Each mould, weighing about 305 kg (6 cwt), was set separately into a timber cradle, bolted to the concrete and individually levelled to allow a built-in camber of 51 mm (2 in). A mild-steel datum face incorporated into the moulds facilitated correct register in the timber cradles. The mould face was only semi-rigid, single skin type, of glass-reinforced plastic, with mild steel local reinforcement, ie stiffened with longitudinal steel angles in flanges and timber struts. This skin allowed a peeling effect during striking of the precast concrete units: timber cradles supported this skin during casting and demoulding was achieved by allowing the skin to rise with the unit only 2in before catches, attached to the cradles effect the release of the skin form the unit.

The mould structure had to be designed to make them capable of standing up to the extreme wear that would be inflicted upon them in a heavy casting schedule. The moulds were used to cast 100 precast concrete units each. The general thickness of the mould was 3/16''. The number of moulds required for this work (30) was in relation to the contract period, not an indication of the working life of GRP moulds (ie had the contract period been longer, less moulds would have been needed). A surface tissue was laminated into the face of the mould to eliminate the possibility of cracks appearing in the face during their working life.

Upon the completion of the building, the architect praised the work by the contractors, John Laing's, as extremely well organised and, overall, the chosen system was proved financially sound, allowed for quality control to be directly under the supervision of site management and consultants, and saved transporting units from a concrete factory to the site through the town centre.

(b) GRP signage, fittings and kiosks: graphic design, integrated reinforcement and durability

The extensive use of GRP formwork for PBS's concrete precast units was supplemented by use of GRP in a number of fittings throughout the building. The material qualities and method of manufacture of GRP were considered to respond to all the special requirements for clarity, modern design, durability and a high level of passenger comfort that was compared to airport standards.

First of all, the public transport function of the building was assessed to require a well-informed public. Building Design Partnership set up a special graphic design department to ensure this and PBS's architect Keith Ingham explained:

> In a building of this size, people could be somewhat overwhelmed by the space and the number of choices they have to make, so we have a 12ft. long model at our office to work out the best method of achieving this.

GRP was ideal for smaller structures that served way-finding requirements. These requirements included signage above each gate (gate number and destination lists) and display units and notice boards throughout the main concourse. Also, the two subways designed to take passengers into the central concourse without facing hazards from manoeuvring buses had numerous advertising panels and travel information. The sign posting system was designed to be an integrated system within the building and demanded a very high standard of typographical reproduction. To maintain this high standard of lettering the necessity for future repainting had to be obviated and both double and single sided versions were to be completely free from visual interference of joints, brackets, frames, rivets, etc.

GRP signs had flush, smooth faces and were therefore visually compatible with the white tiled walls and overall architectural and graphic design applied to the project. Exceptional weathering properties and lack of maintenance were also key requirements, in response to the rough use and public ownership of the building. All finishes were therefore chosen to withstand hard wear.

In a similar way, the large free standing arrows which direct motorists around the multi-storey car park area were made of GRP because, if made in other materials they would be unsightly due to the amount of reinforcement that would have been needed in their construction to make them serviceable. On this same line, the same criteria applied to other fittings designed and constructed of GRP, i.e. litter bins and telephone cabinets. Finally, GRP was used for the larger and more architectural design of the striking orange Car Park pay kiosks. These were again designed by Keith Ingham and were made of GRP because of its design flexibility and the material's exceptional weathering properties.

NATIONAL CONTEXT and SIGNIFICANCE

The use of GRP in PBS was extensively covered in articles during its construction and upon its completion in November 1969. These articles discuss the dual use of GRP – both as formwork for its precast concrete units and for the numerous fittings of varied scale and function. PBS therefore stands out as a significant example of two separate applications of GRP in the building industry: for casting skilfully designed sculptural concrete structural elements of large scale and heavy duty; and for the creation of self-supporting, low-maintenance fittings or pre-fabricated kits of panels.

Varied experimentation with plastics was active during the 1960s and some of this was related to the moulding of sculptural concrete panels. In the early 1970s, articles in the architectural and technical press present a number of examples of use of GRP for principal architectural elements (roofs; external walls, etc). These constitute evidence that the use of GRP in the building industry was soon to become bolder and more visible but this was later than PBS. Such articles also specifically note that the use of plastics was introduced in the English building industry at a slower pace than in other countries[1].

In this context, the use of GRP in the design and construction of PBS constitutes a significant example of use of architectural plastics. Specifically, PBS is quite remarkable for its grand scale and for its integrated approach that resulted in a strongly sculptural effect through the building's structural framework – that is, by placing special emphasis 'on the material as a machine tool rather than a structural medium in itself'. As regards the more visible use of GRP in PBS, this was at a small scale but was also to form an integral part of the building and make intelligent use of the new material's most characteristic properties: integrated reinforcement, form-making flexibility and possibility for striking colouring. In sum, articles published soon after its completion reassert PBS as an early and fine illustration of the versatility of GRP for building purposes: in its two parallel uses of the material PBS demonstrates GRP's design flexibility, its high quality finish and its relative resistance to vandalism and freedom from maintenance.

Integrated design

Although different in scale and principal function, both uses of GRP in PBS were fully in line with the 'integrated design' ethos of BDP and with all functional and structural priorities dictated by the building's demanding programme.

On the one hand, the precast concrete units allowed for a robust structure, as required by the heavy-weight and rough use of a building that involves vehicular access and accommodation. The curved edge units were seen as a natural evolution of the T-beam structure and the result was a structure truthful to its heavy materiality. At the same time, the skilful interplay of solid and void, and light and shade, in the strongly sculptural elevations is marvellously refined by means of the smooth surface treatment and curved shapes effected by the use of GRP moulds.

On the other hand, the GRP internal fittings, signage and the Car Park pay kiosks were lightweight, small-scale accessories that supplemented the principal structure with essential way-finding or other supporting functions. The use of GRP here allowed for streamlined design that could stand out through minimal support elements and striking colouring. GRP was particularly amenable towards these characteristics and colouring in particular was most noticeable in the direction arrows and pay kiosks at the Car Park.

Overall, the use of GRP reinforced BDP's integrated approach that brought together structural framework, architectural expression and graphic design. GRP fittings were also highly durable – and therefore low maintenance – and therefore covered another key requirement of the PBS programme.

[1] 'Although a well-established material, widely used and steadily growing in the building industry, the consumption of plastics in the UK was reportedly 'less per head of population than in the USA, Germany, Sweden or Japan'. (David Kirby, 'UK lagging behind in use of plastics', *Municipal Engineering*, 20 March 1970, pp. S615—S617.)

Context and legacy

The use of GRP for PBS was extensively discussed in the technical and architectural press – both as regards the concrete formwork and as regards the interior fittings and kiosks. For example, the extensive use of GRP in the construction of PBS was noted in an article published in the technical journal *Architectural Plastics* in February 1971. The use of GRP formwork in particular was also noted in a March 1970 article discussing the relatively slow introduction of plastics to the English building industry. Architect David Kirby wrote:

> One of the more intriguing areas in the development of plastics is its use for special shuttering for concrete. This may take the form of standard shutter elements, used to produce bold repetitive shapes, as in the example of a bus station at Preston designed by Building Design Partnership.[2]

1960s
Kirby also noted the use of plastics foams and resins to form and decorate surfaces of concrete panels. He added that this had been developed by a number of artists and used in many buildings, and made special mention of Antony Hollaway's sculptural wall at London Road in Manchester[3] which has been recently listed at Grade II (listed on 10 June 2011; List Entry No. 1400857). Hollaway's sculptural wall was built in 1968, just one year before PBS. Its list description specifically notes the 'constructional and technological quality' of the structure, as well as its innovative method: 'It is constructed of high-quality concrete to engineering standards, and demonstrates the skills and methods developed by Hollaway during the 1960s in the research he ld for the Cement & Concrete Association.'

An illustration in Kirby's article also shows the gable ends of the Faraday Building (Manchester College of Technology), again by Anthony Hallaway and using GRP for its relief casting (1967; architect H.M. Fairhurst of Harry S. Fairhurst & Son). Also, in the 1960s, was William Mitchell's recently listed mural for the former Lee Valley Water Company Offices in Hatfield, Hertfordshire, completed in 1965 (listed on 23 October 2012; List Entry No. 1411385). Mitchell's work is widely recognised and features repeatedly in the Statutory List, nonetheless, this particular project is worth mentioning here as one that the artist himself ranks highly in his oeuvre due to his use of an exceptionally experimental technique. This was described in an article in the *Architects' Journal* (20 April 1965) as involving lining the shuttering with 10in polystyrene and is also noted in its list description.

Although the above examples are slightly earlier than PBS, they refer to structures in which GRP (or other plastics) casting was used for the creation of a decorative surface effect. They were also the result of an artist and architect partnership. On the contrary, GRP moulds at PBS were used in order to shape the edge units of the main elevations that constitute an integral part of the structural framework of the building.

1970s
As regards the use of GRP at PBS for fittings, signage and kiosks, this is worth comparing to the use of GRP panels as principal building elements. Extensive development on this line was to follow in the 1970s, ie later than PBS. Notable examples are the New Covent Garden Market / Flower Market at Wandsworth, London, by Gollins, Melvin, Ward and Partners (1971—4)[4]; or James Stirling's Olivetti Training Centre at Haslemere, Surrey (1971—2). The latter is particularly noteworthy because it is listed at a high Grade (II*) and its list entry specifically mentions the use of GRP: 'important in the development of GRP as a sophisticated building material in England, for it is the major building by a major architect to be built in GRP in Britain' (Branksome Conference Centre, Haslemere, Surrey; first listed on 19 September 1977[5]; list entry updated on 21 January 1997; List entry No. 1244332).

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[2] David Kirby, 'UK lagging behind in use of plastics', *Municipal Engineering*, 20 March 1970, pp. S615—S617.
[3] David Kirby, 'UK lagging behind in use of plastics', *Municipal Engineering*, 20 March 1970, pp. S615—S617.
[4] A J Leggatt, 'GRP and Buildings', *The Structural Engineer*, December 1976, No. 12, Vol. 54, pp. 479—487.
[5] Country house, now conference centre. Dated 1901 over entrance, with later Edwardian additions, by E J May, altered 1971-2 by Edward Cullinan and extended 1971-2 by James Stirling, both for the Olivetti International Education Centre.

Nonetheless, the GRP structures used at PBS are not negligible either. The signage and other fittings were in line with the overall aesthetic of the building. This was effectively a 'machine aesthetic' and the use of an innovative material (plastics) strongly underlined this. At the same time, the GRP fittings suitably served the primary function of PBS: they allowed for visual consistency and clarity in way-finding and other information and also for durability and low maintenance.

A particular legacy of the use of GRP in PBS was the design of the Car Park pay kiosks. Numerous references to the subsequent development of Ingham's design of the pay kiosks into a prefabricated sectional system appeared in the architectural and technical press in the early 1970s. Marketed under the name 'Europa Kiosk systems' by Glasdon Ltd, the new system could provide kiosks of various sizes for different applications, could be easily erected and needed little maintenance.[6]

This was a line of work that BDP, and Keith Ingham in particular, were to follow even further. In a letter to Mr A Barrie of House Publications & Publicity (Technical) Ltd, dated 30 November 1970, Keith Ingham about 'the considerable use of GRP in various ways' in PBS and other of BDP's work in plastics. He noted that 'other items such as the car park arrows, litter bins and notice board frames may well also go into production'. Ingham also commented on BDP's work with the English Electric Reinforced Plastics Division (EERPD) and explained that this 'mainly concerned a sub station enclosure which was designed to exploit the potential of extruded GRP wall panels but [was] at present available only in hand lay up form'. Finally, Ingham mentions that BDP had also been 'commissioned to design a low cost GRP house for developing countries'.

SUMMARY

The extensive use of GRP moulds for the creation of the powerful visual effect of PBS's concrete structure was an intelligent solution to a very demanding building programme that involved vehicular access and large numbers of visitors. The use of GRP for internal fittings and smaller structures (kiosks) also served the programme's high demands for easy way-finding and durability. It was also in line with the 'integrated design' approach of BDP, expressed most clearly in their special graphic design department, and largely contributed to the high level of passenger comfort that allowed for comparisons of the bus station building to standards of 'international airports'.

The use of GRP in the construction of PBS constitutes an early and innovative example as regards the introduction of plastics into the English building industry. It therefore adds to the special architectural interest of the building in accordance with the 'Principles of Selection for Listing Buildings' as regards 'technological innovation and virtuosity'. One could also argue that the element of 'craftsmanship' mentioned in the statutory criteria is here skilfully translated into a 'machine aesthetic' as new materials (plastics) are imaginatively used to create a building that adequately serves a particularly rough use and at the same time creates a distinctive architectural presence in Preston's city centre.

REFERENCES

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- BDP publicity leaflet, October 1969 (selected pages on GRP fittings)
- 'Concrete and GRP' leaflet, n.d. (c1969)
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- Glasdon Ltd publicity booklet, January 1970
- David Kirby, 'UK lagging behind in use of plastics', *Municipal Engineering*, 20 March 1970
- *Building Design*, November 1970

[6] See, for example: *Building Design*, November 1970; *British Plastics*, December 1970; *Municipal Journal*, January 1971.

- Letter from Keith Ingham to Mr A Barrie, House Publications & Publicity (Technical) Ltd, 30 November 1970
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